EMS Annual Meeting Abstracts
Vol. 8, EMS2011-296-1, 2011
11th EMS / 10th ECAM

Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

Stochastic treatment of cloud related processes in nonhydrostatic NWP models

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Ensemble techniques are widely used to quantify how the uncertainties of initial fields, i.e. observations, influence the forecast of a NWP model. To account for intrinsic model uncertainties as well as for unresolved parameter variability, stochastic parameterizations can be employed.

Since cloud processes have a strong influence on the energy and moisture budget of the atmosphere and still dominantly contribute to the overall model uncertainty, these processes represent prominent candidates for stochastic parameterizations.

The question is how to extend existing deterministic parameterization schemes with stochastic physics, i.e. replacing deterministically given parameters with stochastic processes. By means of selected parameters we will demonstrate the application of stochastic processes representing the solution of physically motivated stochastic differential equations.

Using the COSMO model of the German Meteorological Service (DWD) as a test environment we will analyse the effect of stochastic physics on the forecasts and compare with the classical deterministic solutions and observations.